Code No.: (R22MA402BS) | R22 | **H.T.No.** | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Regular) -July- 2024
COMPUTER ORIENTED STATISTICAL METHODS
(CSE)

[Time: 3 Hours] **[Max. Marks: 60]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(10 Marks)**

1. a) Write the Conditions of discrete probability distribution. [1M]
b) Define conditional probability. [1M]
c) The mean and variance of binomial variable X with parameters are 16 and 8, find P(X≥1). [1M]
d) Write recurrence relation for binomial distribution. [1M]
e) If X is normal variate, find the area of A, [1M]
i) to the left of z= -1.78. ii) to the right of z= -1.45
f) Write the mean and variance of the binomial distribution. [1M]
g) Explain test of hypothesis for small samples. [1M]
h) What is the Maximum Error of Estimate E for large sample? [1M]
i) Define regular matrix. [1M]
j) The following matrix is stochastic or not $\begin{bmatrix} 0 & 1 \\ \frac{1}{3} & \frac{1}{4} \end{bmatrix}$ [1M]

PART-B **(50 Marks)**

2. A random variable X has the following probability function [10M]

X	0	1	2	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

(i) Determine K
(ii) Evaluate P(X<6) ,P(X≥6), P(0<X<5)
(iii) Determine the distribution function of X
(iv) Mean
(v) Variance

OR

3.a) Let X denotes the maximum of 2 numbers that appear a pair of fair dice is thrown once. [7M]
(i) Determine the discrete probability distribution (ii) Expectation(iii) Variance
b) If X is continuous random variable and Y=aX+b prove that E(x)=aE(x)+b and V(Y)= a^2 v(x), where V stands for variance and a, b are constants. [3M]

4.a) 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random. Find (i) none is defective (ii) one is defective (iii) P (1<X<4) [5M]

b) The mean and variance of binomial distribution are 4 and 4/3 respectively. Find P(X≥1) [5M]

OR

5. Fit a poison distribution from the following data and calculate expected frequencies. [10M]

X	0	1	2	3	4	5	6	7	8
f(x)	162	193	115	83	44	24	19	8	2

6.a) Given that the mean height of students in a class 158 cms with standard deviation of 20 cms. Find how many students heights lie between 150 cms and 170cms, if there are 100 students in the class [7M]

b) A normal population has a mean of 0.1and standard deviation of 2.1. Find the probability that mean of sample size 900 will be negative. [3M]

OR

7. A Population consists of 2, 3, 6, 8, 11 consider all possible samples of size two which can be drawn without replacement from the population. Find [10M]
i. The mean of the population
ii. The standard deviation of the population
iii. The mean of the sampling distribution of means
iv. The standard deviation of sampling distribution of means.

8.a) Measurements of weights of random sample of 200 ball bearing made by a certain machine during one week showed a mean of 0.824 and standard deviation of 0. 042. Find maximum error at 95% confidence interval? [7M]

b) A sample of 64 students have a mean weight of 70 kgs. Can this be regarded as a sample from a population with mean weight 56kgs and standard deviation 25kgs? [3M]

OR

9.a) The means of two large sample sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the sample be regarded as drawn from the same population of a standard deviation 2.5 inches? [5M]

b) In sample of 500 from a village in Andhra Pradesh, 280 are found to be rice eaters and the rest wheat eaters. Can we assume that the both are equally popular? [5M]

10. Define Markov chain. Explain how you would classify the states and identify different classes of a Markov chain. Give example of each class. [10M]

OR

11. The Markov chain with T.P.M. is $P = \begin{bmatrix} 0.4 & 0.6 & 0 & 0 \\ 0.3 & 0.7 & 0 & 0 \\ 0.2 & 0.4 & 0.1 & 0.3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$. Is this matrix 'irreducible'? [10M]

Which state is absorbing state?

Is the T.P.M stochastic matrix? Also verify its transpose and P^2 is stochastic matrix?

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